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INITIAL SAFETY ELEMENT

MENDOCINO COUNTY

January, 1975



1911-1912

1911-1912



WILLIAMS & MOCINE / CITY & REGIONAL PLANNING

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7 January 1975

Mendocino County Planning Commission
Court House
Ukiah, California 95482

Gentlemen,

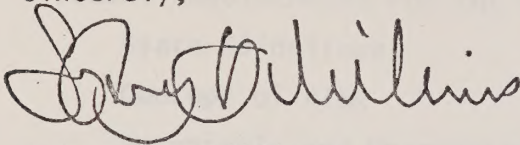
This report has been prepared pursuant to our contract to provide interim guidance to the County with regard to environmental hazards and risks and to conform with the State law which requires that a Safety Element be adopted as part of the Mendocino County Plan.

It is important to emphasize that it is an initial rather than a final document. Our original proposed work program for Mendocino County provided for considerably more in depth analysis of this subject and of seismically related hazards with substantial technical contribution by FUGRO, a geologic consulting firm. However, following a meeting with the Planning Committee of the Board of Supervisors early last year, it was decided to substantially reduce the budgets for these Elements and to eliminate the technical consultants. The funds were transferred to allow more work by Williams and Mocine on the series of Area Plans.

This report contains background and research material as well as the Initial Safety Element. The Element for adoption is found on pages 20 to 28 and is a companion to the Initial Seismic Safety Element. Despite the fact that this is an initial document, it will provide valuable policy guidance to the County. Some short-term actions are recommended along with approaches for long-term studies and programs. Thus, it should be reviewed, revised if advisable, and adopted promptly.

We have enjoyed preparing this work for the County and wish to thank Ronald Hall, staff members, and the others who assisted us. Most important, we have learned a great deal about Mendocino County which will be invaluable as we continue our work on the Area Plans and move towards comprehensive revision of the County-wide General Plan.

Sincerely,

A handwritten signature in dark ink, appearing to read "Sydney H. Williams". The signature is fluid and cursive, with the first name "Sydney" being more prominent and stylized than the last name "Williams".

Sydney H. Williams.
SHW:ji

1887

The following is a list of the names of the persons who have been elected to the office of Justice of the Peace for the year 1887. The names are given in alphabetical order.

John A. Smith
James B. Jones
William C. Brown
George D. White
Charles E. Black
Frank F. Green
Henry G. Hall
Isaac H. Hill
Jacob I. Iron
John J. Johnson
Joseph K. King
Lewis L. Lee
Michael M. Moore
Nathan N. Nelson
Oscar O. Olson
Peter P. Peterson
Quincy Q. Quinn
Samuel S. Smith
Theodore T. Taylor
Ulysses U. Underhill
Victor V. Vance
Walter W. Walker
Xavier X. Xavier
Yves Y. Young
Zachary Z. Zimmerman

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INTRODUCTION

PURPOSE

This report examines environmental threats to public safety and explores the relationships among natural hazards and developed or developing parts of the environment. It summarizes the pertinent findings and defines the general nature of the regulations and programs needed to prevent or mitigate the effects of natural hazards. The report has four major divisions:

- Introduction
- Research and Background Information
- The Initial Safety Element
- Implementation

Only the part of this report defined as the Initial Safety Element is intended to be adopted at this time. The other report sections provide the background needed to set up more future detailed studies of specific problems, and consideration of new regulatory measures and programs for increasing safety.

SCOPE OF THE REPORT AND RELATIONS TO SEISMIC SAFETY ELEMENT

In Mendocino County public safety is threatened by five acts of nature:

- Earthquakes
- Tsunamis
- Landslides
- Fire
- Flooding along streams and in river valleys

Earthquakes and related tsunamis have been covered in detail in the Seismic Safety Element. Land use policies and general recommendations in the Seismic

Safety Element are included in this Element by reference. Since some landslides are triggered by earthquakes, landslide potential is covered in the Seismic Safety Element. However, annual slides may be considered a "natural" occurrence in Mendocino County because of inherent conditions of soil formation and climate. The subject is thus given special attention in the Safety Element. Fire and inland flood hazards are covered exclusively in the Safety Element.

Nuclear war and civil disorder are threats to local safety and local plans to deal with such major catastrophes are part of national and state-wide efforts. Mendocino County's Emergency Plan which deals with these aspects of safety is discussed in this report. Finally, a brief discussion of structural codes is included.

LEGAL REQUIREMENTS FOR THE SAFETY ELEMENT

The legal authority for the Safety Element of the General Plan is California Government Code Section 65302.1 which requires:

A safety element for the protection of the Community from fires and geologic hazards including features necessary for such protection as evacuation routes, peak load water supply requirements, minimum road widths, clearance around structures and geologic hazard mapping in areas of known geologic hazard.

State Guidelines

The California Council on Intergovernmental Relations published General Plan Guidelines^{*} in September, 1973 to further define the intent and requirements of the law. The Guidelines point out that the Safety Element should contribute to land use standards and policies by relating the type and intensity of land use to the estimated levels of risk and to the availability of services and facilities to combat apparent risks. The Guidelines also note its particular relationship to the Circulation Element and its more general

* Williams and Mocine were among the consultants to the state for this publication.

relationship to other elements of the General Plan. In Mendocino County, as elsewhere, the Seismic Safety and the Safety Element are almost inseparable and should be adopted and used as a pair.

Concept of Risk

Risk, by definition, implies calculating the outcome of actions in relation to future events; with incomplete knowledge of the future, estimating "level of risk" implies some imprecision. The Guidelines recognize that this can be done in broad but useful terms by defining the following three levels of risk:

- Acceptable risk - The level of risk below which no specific action by government is deemed to be necessary.
- Unacceptable risk - Level of risk at which specific action by government is deemed necessary to protect life and property.
- Avoidable risk - A set of conditions where potential risk in one location need not be taken because private or public objectives can be achieved in other, non-risk situations at the same or less cost. In this case, government action to preclude risk taking is justified.

Acceptable and Unacceptable Risks

The concept of acceptable and unacceptable risks recognizes that perfect safety is unattainable or so confining and costly as to be undesirable even if approached. Extremely unacceptable risks are easy to determine, for example, buildings should not be placed on known active faults and the laws which prohibit such construction are readily understood. Likewise, no one questions the standards of construction required to insure a high degree of safety in schools and hospitals. The Guidelines recognize that other risk situations which require some local control and regulation are less clearly definable. In some cases an exact and clear definition of acceptable risk is impossible. Existing and proposed development will be looked at differently in most cases of code enforcement and acceptable risk for rural development may be different than that for development at an

urban density. In the last example, the relative number of people exposed to the risk is a factor. Some people value rural isolation sufficiently to build second homes or permanent residences in remote areas with relatively high hazards, few services and bad roads. Homes are widely scattered and only the few families and individuals involved are inconvenienced or endangered; the overall risk is therefore low in comparison to the risk which would occur with intensive development in a similar location. Necessary government action would be different in both cases. For real rural areas, government action might be limited to making maps of high risk areas available to potential buyers and publicizing the fact that community services such as school bus stops or fire protection are not readily available. For urban development government action to make risk acceptable would have to be much more extensive.

Avoidable Risk

The avoidable risk concept applies both to private development decisions and to public actions. Permitting a new subdivision in a remote area with poor access creates an avoidable risk since there are other safe or less remote areas in which to accommodate new subdivisions. Also a subdivision in a forest area might endanger valuable timber resource or otherwise damage the environment and should be avoided. Choices must sometimes be made. One public body might want to build a dam for irrigation or domestic water supply; however, there may be a strong possibility of development in the valley below the proposed dam at some future date, making such a dam prohibitively expensive. The choice of solution not only must avoid risk, but also must be acceptable economically and socially. The foregoing discussion suggests the futility of attempting to evaluate precisely the risk levels in all locations and under all circumstances. However, the following sections of the report discuss specific hazards and evaluate risks as far as possible. Sometimes, as in the delineation of flood plains, it is necessary to proceed on the basis of limited information. In future years, as more detailed follow-up studies are made and new regulations formulated, it may be possible or necessary to refine risk levels in some parts of Mendocino County.

RESEARCH AND BACKGROUND INFORMATION

LANDSLIDE HAZARD

Landslides are an evolutionary process in the landscape which must be understood and respected. Slides and soil creep are common in most of the hilly and mountainous country in Northern California. In Mendocino County slides occur, in some cases, on slopes as gentle as 3 to 5 percent due to the natural instability of the surficial (surface) material.¹

The amount of landsliding in any area is affected by geologic and hydrologic factors, such as the degree of water saturation, the strength of the rock, the slope angle, the mass of the deposit and the types and extent of the vegetative cover.² It can also be disastrously accelerated or triggered by man-made actions such as unwise grading, deforestation and modifications to the land which are deemed necessary for development. The material of the Franciscan Formation, comprising most of the eastern half of the country, is highly fractured and sheared and in its weakened condition is unstable and slide prone¹, particularly during the typically heavy winter rainfalls, from late November through March, when the soil becomes highly saturated.

The winter storms of 1973-74 triggered extensive sliding throughout the County. Major damage was done to County roads, the County was declared a disaster area by State and Federal governments and will receive a federal grant to help repair damage. The County Road Department supplied information to map the areas of road slides during this disastrous year and these data are included as part of the Safety Element. Information on State highway and off-road slides is not available but the scale of the hazard is sufficiently demonstrated by the County road information. If a major earthquake occurred to set-off slides in the rainy season, slide damage would undoubtedly be even more extensive and serious than that shown on the map.

¹ Cooper, Clark Associates, 1972

² Tri-City Seismic Safety and Environmental Resources Study, 1974.

FIRE HAZARD

General Considerations

The State Division of Forestry divides Mendocino County into three types of areas, each with a different fire potential: timber, brush and grass-oak woodlands. The County's relatively high rainfall makes it less subject to fire than semi-arid southern California Counties such as San Bernardino. However, a timber fire will result in a much greater dollar loss than a fire in less-productive brush land.

Heavy timber lands do not burn as readily as brush or grass land but once timber is set afire it is difficult to control and extinguish the fire. Rough topography and poor access in the County contribute to fire control problems. The dollar loss depends on the market value of the timber at the time of the fire, but the cost is high and increasing. Grass-oak woodlands are generally used in the County for grazing and can be kept free of brush. When this is done fires are relatively easy to control and less damaging than many other types of fire.

Well tended grazing land burns over without destroying any trees and indeed may be purposefully burned under controlled conditions to keep down undesirable brush and improve the pasture. Chapparal or brush lands occur naturally or result from untended and unused pasture land and from cut-over timber and which may grow up in low brush. If left untended for many years, brush lands become very dense and thus very dangerous fire areas. Where brush lands and urbanization meet, a hazardous fire zone naturally ensues.

In summary:

- Timber fires constitute a high risk to property but do not start easily and occur with less frequency than brush fires.
- Close-in brush fires may endanger life as well as property and are easy to start but the risk is lowered because fire-fighting equipment is usually available quickly and can be lowered further by controlling the brush.

- These examples illustrate that there is no simple way of establishing the precise level of risk in the three types of fire areas.

Protection

Fire protection is provided by the National Forest Service in Mendocino National Forest, by the State Division of Forestry in "wild lands" and by local fire departments and districts. Technically the local districts are the only ones which are charged with structural protection, the State and Federal agencies being limited to wild land protection. The City of Ukiah has a full time professional staff; some districts have one or two professionals augmented by volunteers and others are wholly volunteer. It is beyond the scope of this study to evaluate the departments or to make recommendations concerning expansions, consolidations or changes. The State Division of Forestry reported that the local districts are well organized and efficient at the present time.

Mendocino County is in the North Coast Region of the California Division of Forestry and their regional office is in Willits. The division maintains permanent ranger stations and sets up seasonal fire watches at additional locations. Air operations to fight fires are carried out from Ukiah airport. By authority of California Public Resources Code 4291, the State Division of Forestry also inspects and enforces the mandatory minimum clearance of 30 feet around structures. The Division has also developed fire safe regulations for land divisions in wild land areas. These have not yet been adopted as part of the County code though the Board of Supervisors has signified its intent to do so. The regulations and possible modifications are discussed in the Implementation section.

Overall, the level of fire protection in Mendocino County seems consistent with that provided in other rural California areas and as adequate as can be expected in such a large, sparsely populated area. Some recommended considerations for future action are contained in the Safety Element itself.

FLOOD HAZARD

Information on past and potential flooding is summarized from publications of the United States Geologic Survey and from the Comprehensive Framework Study on Flood Control of the Water Resources Council, an interagency committee reporting to the governor and to Congress. The Framework Study finds

..... that serious flood problems exist in the California Region. Although existing flood control measures have been very effective in their respective areas, damages continue to increase. Except for the inherent flood risk, most of the flood plain lands are ideally located for residential, commercial, industrial and agricultural development. As the population and economic activity . . . continue to grow, recurring floods will cause increased loss of life, human suffering, damage to property, and loss of goods and services . . . Although complete flood protection is an unrealistic goal, an economically justifiable degree of flood protection should be secured for the region. As a minimum, protection from a once-in-10-year flood should be given to agricultural areas and protection from the once-in-100-year flood should be provided for urban areas. In developing the future program for alleviation of flood damages, consideration was given to structural and non-structural methods. . .

The flood control program recommended to state and federal agencies is "at the preliminary or reconnaissance level. . ." It recognizes the seriousness of the problem in an area including the County and, although it does not go into extensive detail on all the Mendocino County streams, the approach is comprehensive and will provide a useful guide for special studies and action programs at the local level.

Scope of Problem in Mendocino County

The Safety Hazards Map, a part of the Safety Element, shows areas of the County subject to flooding during the 1964 flood.* Mendocino County falls into two

* The Framework Study refers to the Flood of December, 1964 as being "of unprecedented intensity for so vast an area." It is assumed to represent the 100 year flood and thus, the chances of like flooding occurring in any one year are 1 in 100.

of the study's sub-regions: the North Coast Area (from just north of the mouth of the Russian River in Sonoma County to and including the Klamath River Basin in southern Oregon) and the San Francisco Bay Area (taking in the Russian River Basin). Limited information on the history of flooding and damage has been compiled by individual streams; that which applies to Mendocino County is given on the following pages. Insufficient information is available for the County; for instance, only one damage center (Guerneville, which is in Sonoma County) is listed for the Russian River and the damage for the various segments of the stream is not tabulated separately. The tables give a general indication of existing and future scale of the problem but need refining for local application in Mendocino County.

Present Status of Flood Damage Prevention Measures

Existing flood control measures on any of the coastal streams are very limited. They include some flood forecasting and minor levee and channel projects. Flood forecasts are distributed through the River District Offices in Eureka (for the coastal streams) and San Francisco (for the Russian River). The points where forecasts of water levels are made are shown on the Safety Hazards Map. Lake Mendocino, created by Coyote Dam above Ukiah, provides substantial protection along the upper Russian River. It has a maximum of 48,000 acre feet of flood storage capacity during the most critical flood periods, controlling run-off from a drainage area of 105 square miles. As indicated on the Safety Hazard Map, it does not offer protection for the Ukiah area during a flood of the magnitude of the 1964-65 winter flood, a hundred year flood, or even lesser floods such as that which inundated State Street last winter. Numerous small detention structures provide an additional storage capacity of 5,000 acre-feet along lower portions of the River in Mendocino and Sonoma County. These are of varying quality and for the most part have been only partially effective. No detailed information is given in the Framework Study on watershed treatment for the North Coastal Area, although some measures such as critical area planting, tree planting, range seeding, fire prevention and suppression have been carried out in unspecified sections of the sub-region. Watershed

COMPREHENSIVE FRAMEWORK STUDY, 1971
Water Resources Council
ESTIMATED FLOOD DAMAGE FOR
THE 100-YEAR FREQUENCY FLOOD
FOR SELECTED STREAMS

| Study area/ stream | Area inundated (1,000 acres) | Forest & range resources | Forest & range facilities | Crop & Pasture | Flood Damage ¹ - (\$1,000) | | | | | Total |
|--------------------------|---------------------------------------|--------------------------------|---------------------------------|----------------------|---------------------------------------|------|--------------------------------|------------------------------|----------------------|--------|
| | | | | | Other Agricul- tural | Land | Residential & commercial | Industrial & utilities | Public facilities | |
| Westport Stream Gp. | 0.3 | 0 | 0 | 34 | 10 | 3 | 1 | 21 | 0 | 69 |
| Ten Mile River | 0.8 | 0 | 0 | 138 | 11 | 14 | 36 | 53 | 20 | 272 |
| Noyo River | 0.3 | 0 | 5 | 0 | 00 | 4 | 115 | 107 | 6 | 238 |
| Big River | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 44 | 0 | 44 |
| Navarro River | 1.4 | 1 | 18 | 280 | 46 | 106 | 200 | 69 | 33 | 753 |
| Alder Creek | 0.5 | 0 | 0 | 8 | 1 | 3 | 0 | 18 | 0 | 30 |
| Garcia River | 2.4 | 0 | 0 | 422 | 7 | 69 | 0 | 0 | 0 | 498 |
| Gualala River | 1.5 | 16 | 0 | 6 | 0 | 6 | 0 | 0 | 56 | 84 |
| Russian River | 51.4 | 3 | 0 | 3,634 | 1,013 | 956 | 11,986 | 156 | 5,162 | 22,910 |
| Dry Creek | 3.6 | 0 | 0 | 632 | 185 | 181 | 110 | 9 | 116 | 1,233 |
| Sulpher Creek | 0.1 | 0 | 0 | 1 | 3 | 3 | 1 | 0 | 3 | 11 |
| Santa Rosa Creek | 1.1 | 1 | 0 | 7 | 7 | 1 | 10 | 0 | 50 | 76 |

¹ Based on July 1965 prices, economic conditions, and project conditions.

COMPREHENSIVE FRAMEWORK STUDY, 1971: WATER RESOURCES COUNCIL
EXISTING

ESTIMATED AVERAGE ANNUAL FLOOD DAMAGE FOR URBAN
AREAS WITH SIGNIFICANT FLOOD PROBLEMS
BASED ON 1965 CONDITIONS OF PHYSICAL AND ECONOMIC DEVELOPMENT

| Study area/ stream | Damage center | Residential | Average annual flood damages (\$1,000) | | | Total |
|-----------------------|--------------------|-------------|----------------------------------------|---------------------------|----------------------|-------|
| | | | Commercial | Industrial & utilities | Public facilities | |
| Russian River | Guerneville | 620 | 290 | 9 | 225 | 1,144 |
| Navarro River | Anderson Valley | 2 | 6 | 5 | 0 | 13 |

PROJECTED

SUMMARY OF ESTIMATED AVERAGE ANNUAL FLOOD DAMAGE FOR URBAN AREAS WITH SIGNIFICANT FLOOD PROBLEMS
-PRESENT AND FUTURE CONDITIONS OF ECONOMIC DEVELOPMENT
WITH EXISTING FLOOD CONTROL MEASURES-

| Study area/ stream | Damage Center | 1965 economic conditions | Average annual flood damages ¹ (\$1,000) | | |
|-----------------------|--------------------|-----------------------------|-----------------------------------------------------|-----------------------------|-----------------------------|
| | | | 1980 economic conditions | 2000 economic conditions | 2020 economic conditions |
| Russian River | Guerneville | 1,144 | 2,153 | 4,604 | 6,240 |
| Navarro River | Anderson Valley | 13 | 22 | 53 | 121 |

¹ Damages are based on July 1965 prices and project conditions and estimated economic conditions for the year shown.

treatment in the Russian River Basin is limited to Sonoma County. Flood Plain information studies have been made for the South Fork of the Eel River and for portions of the Russian River Basin.

Limitations of the Framework Study in Mendocino County

From the brief summary given, it is clear that the Framework Study does not supply all the information needed in Mendocino County. Additionally, many of its recommendations have become out of date through the passage of the Wild Rivers Act, (Senate Bill 107). Mendocino County and Round Valley took a decisive role in passage of this legislation and it is discussed in some detail in the section on Implementation.

The Framework Study advises that not all urban areas have been critically examined and recommends that the various jurisdictions take action to define problems and determine the remedial and preventive measures needed. This is certainly true for the Ukiah area and for the various coastal streams which received very little attention in the Study. Anderson Valley on the Navarro River is recognized as a major damage center but remedial measures are not recommended. Other known problems such as those at Fort Bragg were not covered and much local effort will have to be expended to develop a real flood protection program.

Federal Assistance Available

The Federal Flood Plain Management Services Program (a HUD program) is available to assist qualified agencies. It might be appropriate for Mendocino County and is summarized here. This program was established to provide Federal, State, and local governmental agencies with flood hazard information that would: 1) serve as a guide for future development of land, 2) provide a basis for regulation of land use to avoid future flood damage, and 3) assure that Federal agencies will take proper cognizance of the flood hazards associated with the development and management

of flood plain area. As it is presently constituted, the program includes:

Flood Plain Information Reports: Flood plain information reports are prepared at the request of State and local governmental agencies to delineate flood plains in communities throughout the nation. These reports contain illustrative and narrative material on past floods, and similar data on floods that may reasonably be expected to occur within a community area in the future.

Technical Services and Guidance to Governmental Agencies: Federal, State and local governmental agencies are provided assistance with the following: interpretation and application of data in flood plain information reports; preparation of flood plain regulations; suggestions for floodway areas and evaluations of the effect of floodways; information on flood damage reduction by various structural and non-structural measures; and evaluation and use of flood hazard data to make wise decisions on the locations of public buildings and other publicly owned facilities, and on subdivision development or other land uses where there is a Federal interest.

Research, Guides and Pamphlets: Research studies are directed towards improvement of methods and procedures of flood damage reduction. Guides and pamphlets are prepared for the use of Federal, State, and local governments and private citizens in planning and implementing programs to reduce the flood damage potential of an area.

Comprehensive Flood Damage Prevention Planning: Planning efforts at all appropriate governmental levels are considering flood control works, flood proofing, flood forecasting, zoning, subdivision regulations, building codes and policies that will work in combinations or separately to provide the best solution to the flood problem associated with the community. Engineering services and technical assistance and guidance are provided throughout the course of planning and implementing measures needed to reduce the flood damage potential.

Dam and Reservoir Hazards

Serious damage to the Van Norden Reservoir above the heavily populated San Fernando Valley occurred during the earthquake of 1971. Residents were evacuated from the area which would have been inundated had the dam failed. Fortunately the reservoir was successfully drained without dam failure and disaster was averted. This example of potential disaster explains recent State legislation requiring the mapping of all potential inundation areas below any dams (public or private) which are above a specified height and/or capacity; further, the legislation requires governments to take account of potential inundation in land use planning and land use regulations once the information on problems is available. The State Office of Emergency Services is charged with carrying out the program and is working in Mendocino County at the present time. Dam owners are required to hire engineers to do the actual mapping. Obviously the scale of the problem, in terms of the population endangered, is much smaller than that of the San Fernando Valley. However, 16 dams in Mendocino County fall under the regulation (three have been exempted since the owners were able to prove failure would not endanger life). Others to be built in the future will also qualify.

DISCUSSION OF STRUCTURAL AND HEALTH CODES IN RELATION TO SAFETY

During the past two decades, building technology has become more complex and standards of construction have risen; as a result, codes for public and private construction have become increasingly complex and more comprehensive in scope. To a great extent, codes have been standardized across major portions of the nation. The purpose of structural, housing and health codes is to protect the health, safety and welfare of citizens and this has many implications for the Safety Element. Codes are implementation measures-- they are laws rather than broad policies or programs for safety. It is not within the scope of this study to make detailed studies of the codes or to recommend specific revisions or changes. However, in Mendocino County and elsewhere, existing codes and enforcement procedures have been criticized strongly in recent years, as being unduly restrictive and therefore a brief exploration of some of the major issues is included here.

New Construction and Existing Buildings

There are many existing structures which were built under old codes or even prior to passage of the first code. These offer a different risk potential than those built to more modern standards. When the older buildings are used for public assembly or occupied by a sizable work force the risk potential is greater than in an old structure used only for storage. Many older buildings still have a useful life if risk can be reduced to an acceptable level. However, the means of reducing risks must be economically feasible. This is frequently not possible if structures must precisely meet existing codes. The high costs of construction and energy have led to some innovative and flexible approaches to this problem. One approach, emanating from Long Beach, is to give a choice to an owner of a building which does not have the required code capacity to resist lateral forces. He may reduce the occupancy of the building, reduce its life expectancy, strengthen the structure, or effect some combination of the three. Overall risk is reduced by limiting the number of people exposed, the duration of exposure, or the danger of structural failures. This flexibility permits a reasonable solution to be chosen in a particular situation. It has most application to private structures used for industrial, commercial or public assembly purposes but could apply to older dwelling and apartment structures as well.

Rehabilitation of Housing

An older house, even one that is not in severe disrepair, will usually have some minor code violations; where housing has deteriorated, violations will run from minor (insufficient electrical outlets) to major (dangerous wiring or insufficient plumbing). In some cases it would be economically feasible to improve the house so that it would not be a hazard but not feasible to bring it up to the standards required for new construction. A permit for rehabilitation, however, will generally require all major and minor violations to be corrected. In this period of high building costs and housing shortages there is interest in developing special rehabilitation codes for

older housing so the useful, safe life of homes can be extended. In order to meet economic pressures, an owner might be permitted to plan a five year rehabilitation program with serious violations receiving the immediate attention and lesser matters deferred. Thus dangerous wiring could be replaced and the roof mended immediately, a new room added later and finally old inadequate plumbing replaced. Ideally, the building inspection department would be given resources and time to actually assist in planning rehabilitation and remodeling with owners and giving advice on materials and procedures. This would be a positive role for the department and would require an additional budget. It could pay-off in terms of safety and health however and is an approach which may be considered.

Rural and Urban Standards

Present housing codes give little choice in terms of facilities and standards required in a single family home. It is logical to assume that rural families need and deserve the same safety and health standards of city families yet some factors are variable: a septic tank is unsafe in San Francisco, is safe in suburban large lot subdivisions and could probably be dispensed with entirely in a rural homesite of 10 to 20 acres. Criticisms of present blanket codes range from unnecessary high cost, ecological un-soundness, lack of freedom of choice and infringement of constitutional rights, through the contention that innovation in technology is stifled. A variable code would have some advantages. On the other hand, it might be difficult to enforce equitably and there might be objections from owners who already had met or were required to meet the existing standards. As one solution, it is suggested that some specified rural sections of the County be permitted special standards under certain conditions of location, density, etc. Everyone in the specified areas would then be subject to the same laws and treated equally. In other more urban areas, conventional standards would be in force. This could do away with the criticism of a dual standard and would permit flexibility for home owners through choice of location.

Owner built houses and innovative construction methods sometimes need more supervision and more inspections than conventional homes, in order to ensure reasonable safety and health standards. This should be recognized and special standards should not be interpreted as a way of doing away with all standards. The building inspection department needs to assume an advisory role as well as carrying out its traditional enforcement duties.

Major code revisions would be required to carry out the suggested approach. First, the general concept of special standards would need to be thoroughly explored and accepted by the public agencies involved. Some detailed technical studies (including a legal analysis) would have to be carried out prior to changes in the code.

EMERGENCY PLAN

Analysis

Mendocino County's present Emergency Plan was prepared in 1970-71 in response to State and Federal directives for Civil Defense. According to the State Emergency Service Office the Emergency Plan is the Administrative Document of a yet to be completed Comprehensive Plan. It sets up the authority and procedures for action. It would automatically be activated by a state of war emergency or by order of the Chairman of the Board of Supervisors in time of local emergency. The County organization is the link between local jurisdictions and the State Civil Defense Organization. The Plan sets up procedures to coordinate local government and private resources and provides the vehicle for mutual aid among jurisdictions, primarily in the case of nuclear war.

The major emphasis in the Administrative Plan is on a "War Emergency" and, in line with national policy at the time, it is assumed that the greatest threat in any part of the United States is from nuclear attack. Administrative organization to deal with such a catastrophic event is therefore the

primary concern in the Plan. Currently, the State Office is shifting its emphasis more towards natural hazards and local contingency planning which will be more applicable to Mendocino County.

The section on "Major Peacetime Emergencies" recognizes that "the potential of a major calamity increases with the continuing urbanization of previously unpopulated areas, and with the advent of industrial processes which utilize hazardous materials." The first is clearly applicable to Mendocino County in the case of any urbanization of remote areas. The second, applying to industrial process, could become applicable. Basic emergency situations which the County will respond to are listed as earthquake, seismic sea waves, flood, fire, accident (transportation or industrial) and civil disturbance. These statements are complete enough to indicate some awareness of potential local needs. The remainder of the section on major peacetime emergencies sets the detailed procedures for each stage of an emergency in terms of the organizational structure among the various responsible agencies.

Attachment B of the Emergency Plan outlines four stages of basic action. The first is Readiness Condition Four, "increased readiness" for either war or a peacetime emergency. The other three stages apply primarily to nuclear attack. Readiness Condition Four is intended to be operative in normal times. Attachment B, although very general, outlines the steps to initial emergency preparedness on a county-wide basis:

"Actions

- "a. Develop and improve emergency organization, staffing resources, and supporting systems.
- "b. Review, update, and maintain the basic operations plan, annexes, SOPs, alert lists, and prepare inventory lists of emergency manpower and material resources; designate relocation sites for essential resources; issue implementing administrative orders, updating as necessary.

- "c. Develop the maximum practicable fallout shelter capacity and readiness in existing structures; prepare plans for emergency construction, stocking, use, and management of expedient fallout shelters.
- "d. Develop and improve the Emergency Operating Center (EOC) and other control facilities.
- "e. Improve emergency communication, warning, radiological defense, situation intelligence, emergency public information, and mass care systems.
- "f. Conduct and participate in tests, exercises, and training programs; prepare plans for accelerated emergency training.
- "g. Conduct public information programs to educate people in readiness and survival actions."

Critique of the Plan

The Emergency Plan is far too abstract, and general, and perhaps too war-oriented to be applicable to the kinds of natural emergencies which are likely to occur in separated and limited areas in Mendocino County (fire, tsunamis, etc.). However, tests, exercises, and public education in emergency preparedness are clearly worthwhile. The Plan no doubt fills an important need in alerting officials and agencies to the kinds of organizations needed in emergency situations. It outlines the chain of command and defines the type of action required at all levels of government at various stages of an emergency. However, as noted, only the first stage applies to most natural emergencies.

Emergency Facilities

The Emergency Plan shows the Fair Grounds as a major center for emergency housing. Other facilities would also be important and the Emergency Centers Map, which is part of the Safety Element shows the major ones which could be used.

The County Health Department with the main office in Ukiah would act as the coordinator of medical services in any disaster. It also maintains a branch office in Fort Bragg and message centers in Willits and Boonville. All five hospitals in the County accept emergency patients and during any disaster would be important centers for treatment and health control measures. There are also staffed clinics in Covelo and the town of Mendocino as well as an Indian Health Project in Ukiah. All these vital centers are shown on the Emergency Centers Map. Additionally, the location of the eight high schools are shown since these have space and facilities which could be utilized during emergencies. They would be the logical points for food distribution, information dissemination and emergency shelter.

THE INITIAL SAFETY ELEMENT

The Initial Safety Element consists of three sections: Policy, Identification of Hazards - Evaluation of Risk, and General Nature of Needed Programs and Regulations.

POLICY

The following basic policies, developed from 1973 conferences, which included County officials, staff and citizens, are an inherent part of the Safety Element.

- The residents of Mendocino County, the Board of Supervisors, and responsible public agencies recognize the potential damage which can result from fire, flooding and geological occurrences.
- The County will urge implementation of the Emergency Disaster Plan with any needed additions to reduce the risk of death, injury or loss of property due to hazardous natural conditions.
- The County will establish as far as possible the acceptable level of risk it can afford, in relation to safety and benefit to residents and to cost.
- The County will set priorities for abatement of existing safety hazards, recognizing the variable frequency of hazardous events and degree of risk engendered by various activities and land use.
- The County will use zoning and building codes to insure reduction of potential hazardous conditions relating to existing and new structures.

MENDOCINO COUNTY

Safety Element

SAFETY HAZARDS





0 5
MILES



WILLIAMS & MOCINE
CITY & REGIONAL PLANNING
1041 SANSOME STREET, SAN FRANCISCO, CA 94111

NOVEMBER 1974

flooding

-  100-YEAR FLOOD (1964 flood areas)
-  RIVER FORECASTING STATIONS
- sources: U.S. Army Corps of Engineers, 1965
Water Resources Council, 1971

slide damage

-  1974 SLIDE DAMAGE ON COUNTY ROADS
- source: Mendocino County, 1974
-  major roads

IDENTIFICATION OF HAZARDS AND HAZARD AREAS - EVALUATION OF RISK

Fire

The potential for fire is highest in the brush and brushy woodland areas; property damage could also be high with fire in the valuable timber areas although heavy timber is not as inflammable as brush. The United States Geological Survey maps of Mendocino County show vegetative cover and sufficiently identifies the high fire potential areas. These maps are readily available to the public and are on file in the County Planning Office; they are not reproduced here.

Most of the County is sparsely populated at the present time and the risk may be considered relatively low and acceptable. Present protective measures for the rural areas are adequate and reduce risk as much as feasible.

Flooding in the Inland Valleys and along Coastal Streams

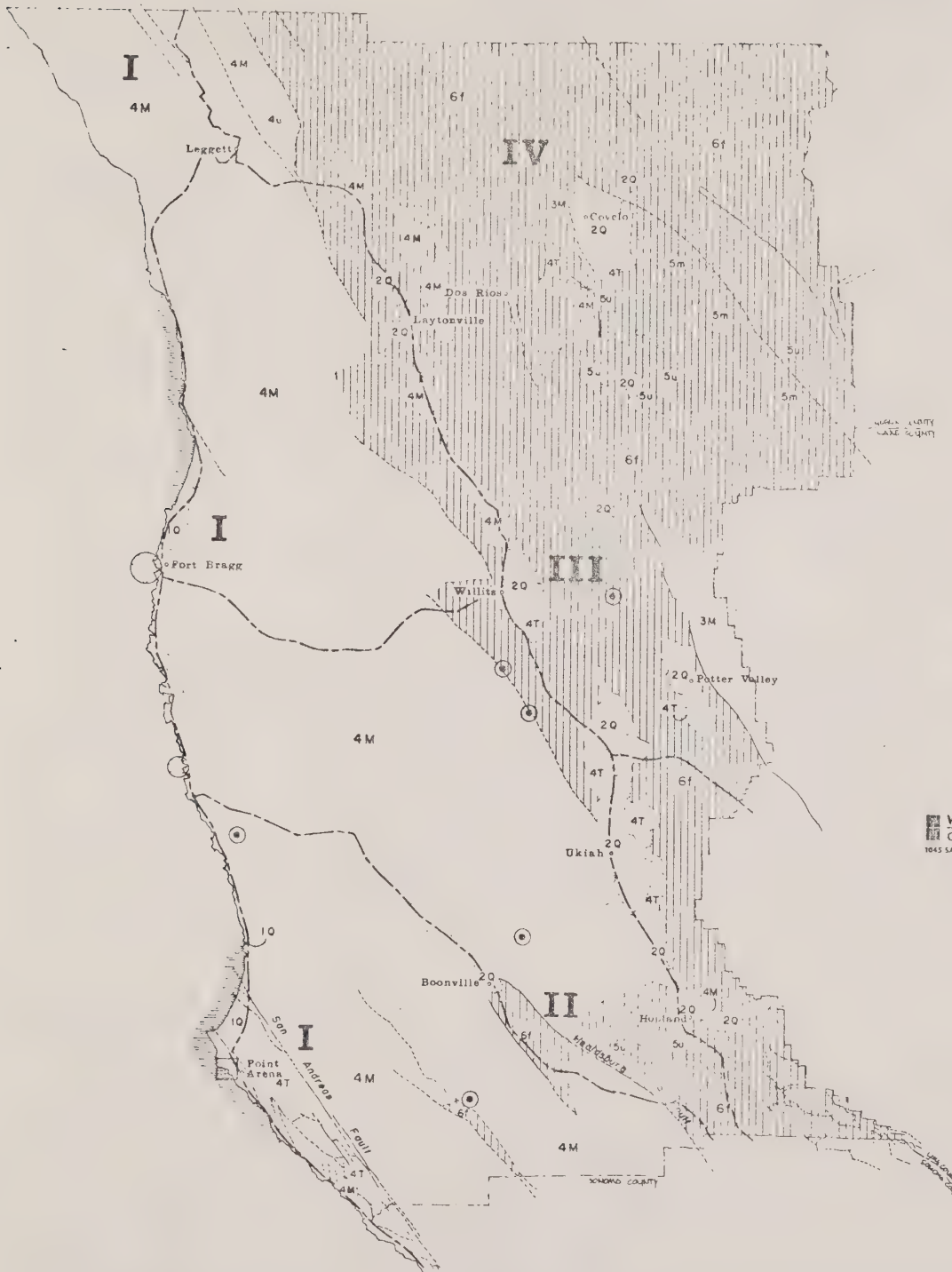
The Safety Hazards Map identifies major areas of flood hazard. However, additional areas not precisely delineated on any available source, are known to be subject to periodic flooding and damage. For instance, portions of Ukiah are inundated periodically. The coastal streams also flood and potentially hazardous conditions exist along them.

In rural areas subject to sporadic or even regular flooding the risk to life is acceptably low and will continue to be so as long as flood plains are not developed with homes. Information on soil quality and crops in Anderson Valley shows that soil in the flood plain of the Navarro River is generally of lower quality than adjacent fields. This may be the result of flooding and erosion which could constitute a risk to agriculture. Additional information and research is needed before risk can be evaluated here and in similar situations. All coastal streams need more study and mapping to determine the level of existing and potential risk.

MENDOCINO COUNTY

Seismic Safety Element

GEOLOGIC HAZARDS



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SEPTEMBER 1974

seismic features

- FAULTS
- - - FAULTS approximate location
- ⊙ EARTHQUAKE EPICENTER 1934 to 1971

source: Cal Div of Mines and Geology 1972

hazard zones

- I** SAN ANDREAS FAULT ZONE
- II** HEALDSBURG FAULT ZONE
- III** CENTRAL COUNTY ZONE
- IV** NORTH COUNTY ZONE

tsunami hazard

- ⊙ SEVERE HARBOR DAMAGE
- LESS SEVERE HARBOR DAMAGE
- POTENTIAL HARBOR DAMAGE

LOW COASTAL AREAS
AND PUBLIC BEACHES

source: Cal Div of Mines and Geology 1972

— major roads

landslide hazard

BASED ON GENERALIZED GEOLOGIC UNITS

| 1 | 2 | 3 | 4 | 5 | 6 |
|------------|---|---|---|---|------------|
| LEAST | | | | | MOST |
| LANDSLIDES | | | | | LANDSLIDES |

GEOLOGIC TYPES

- Q** Quaternary sediments
- T** Tertiary & Tertiary-Quaternary sediments
- U** ultrabasic rocks, mostly serpentine
- M** Mesozoic sedimentary rocks except Franciscan Formation
- f** rocks of Franciscan Formation
- m** metamorphic rocks

source: Radbruch, USGS 1970

In Ukiah, the risk is at an unacceptable level now. Since the City cannot remedy the situation alone, it is also a concern of the County, and joint action will be necessary.

Landslides

The Geologic Hazards Map was prepared for the Seismic Safety Element and is reprinted here. It shows soil types and identifies unstable areas in general. The Safety Hazards Map shows where slides on roads occurred during the winter of 1973-74. The potential for slides is high in much of the County since soil instability is widespread, particularly in the eastern portion of the County. Undeveloped, though unstable hill sides naturally do not constitute an actual present risk. Potential risks in this case may be classed as avoidable since safer areas are available for any needed development.

Road slides are essentially an unacceptable risk, since isolated valleys and rural settlements can be cut-off by road closures. Interrupted access could escalate a minor emergency (local flooding or sickness for instance) to a major one. Thus, people living in an outlying area, although not subject to slide damage could be endangered by a slide closing an access road. It follows that unless access can be assured, isolated areas should not be developed.

Seismically Active Areas

The Geologic Hazards Map shows high risk areas based on available information on earthquake faults and tsunami threats. Additional study by the Corps of Engineers is being carried out and will enable the County to refine the Seismic Safety Element in the future. The San Andreas Fault is accurately drawn on parcel maps and this information is available for reference in County offices. These maps supplement the information given in this report and in the Seismic Safety Element. Information this precise is not presently available for other earthquake faults in the County.

Evidence shows that the potential for earth movement and damage is highest in the coastal area where affected by the San Andreas Fault. Since population is low in most of the area, the risk level is correspondingly low and generally acceptable. Avoiding future risk will involve detailed soil testing and special regulations for building location and structural requirements. Some areas subject to tsunamis are low risk areas now and/or constitute avoidable risk areas for the future.

GENERAL NATURE OF NEEDED PROGRAMS AND REGULATIONS

Land Use Planning and Regulation

Since Mendocino County is largely rural, it has an agricultural base, some untapped agricultural potential in the inland valleys with mild climate, as well as untapped timber resources. It has certain high risk areas for urban development but it is also subject to moderate development pressures and can absorb some increased population in the next decade. These facts point out the absolute necessity for land use policies which will protect agricultural areas and timber reserves and which will direct growth and development to areas where life, property or resources will be least endangered. Mendocino County is fortunate that it still has opportunity to do this and to avoid development situations which would require costly corrective measures in the future.

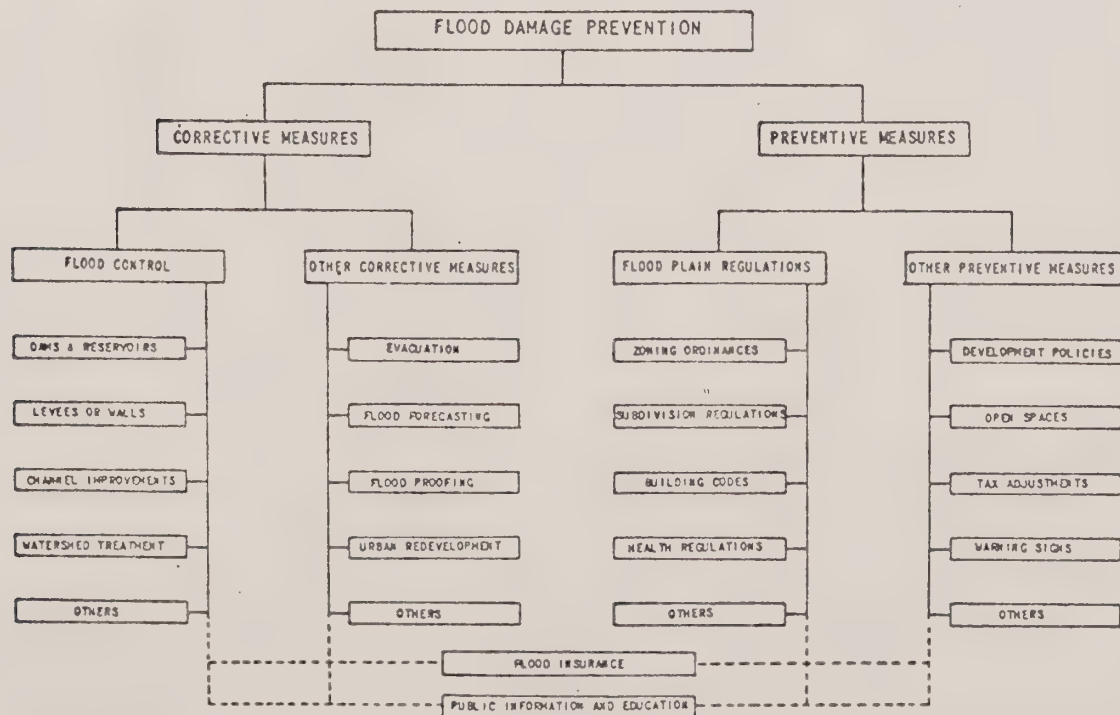
The County is now undertaking the comprehensive revision and up-dating of its General Plan and the Safety and Seismic Safety Elements make a valuable contribution to the nature of the General Plan. In terms of Safety, the general nature of land use planning decisions and regulations will be guided by the following practical considerations:

- . Urban expansion clustered around existing centers in low or acceptable risk areas is the most efficient pattern and will keep the level of risk low.

- Residential development including rural non-farm or second homes should be generally precluded in areas where access cannot be economically assured or where other natural risks are high.
- Resources such as timber and agriculture must not be endangered by the encroachment of either urbanization or low density recreational subdivisions.
- Since the knowledge of all high risk seismically active areas is limited, care must be exercised in granting development permits for areas of probable risk until more research is available.

Flood Plain Studies and Regulations

A comprehensive program for reduction and avoidance of flood damage will include structural and non-structural measures. The following diagram is from the Framework Study cited earlier.



Since the passage of the Wild Rivers Act (Senate Bill 107) structural flood control projects on the Eel River are precluded until at least 1984. Non-structural measures are most important in Mendocino County generally. The diagram includes non-structural flood plain regulations and development policies as major parts of the comprehensive program. This demonstrates the close relationship between programs for flood damage protection and land use planning and the importance of the present planning program to revise and up-date the General Plan in coordination with the Safety Element. The first step is, of course, accurate mapping of all flood plains and potential inundation areas. Existing flood plain zoning provisions are weak and revision has been proposed as part of the new zoning ordinance. The revision defines the primary plain (the channel which must not be obstructed to permit free flow of water under flood conditions) and the secondary flood plain (area outside the channel but subject to flooding). Permitted activities and uses are different in each. In the short- and intermediate-range future, these programs and regulations are needed to reduce flood hazards in the County.

Landslides

Mitigation of existing unacceptable hazards must be accomplished by road improvements and realignments to ensure free access to all developed parts of the County. Both Route 20 and 128, the cross county roads connecting the coast and the interior valleys with the main north-south highway (US 101) are subject to slides and closure. These are the most critical routes demanding attention. Improvements of these routes will lessen the potential impact of disasters in the County.

Equally important as mitigating existing problems is avoiding future problems. Soil stability along proposed access routes must be a significant factor in land use planning and a subject of investigation in all development proposals. Finally, development of unstable hillsides must be avoided.

Fire

Remote areas and rugged topographical areas where access is limited or cannot be assured, heavy brush areas, and valuable timber areas all constitute potential risk areas. They are in the avoidable risk category and should be considered so for the future. Land Use planning and regulation will be the most effective measures to insure that risks remain at an acceptable level.

The forest service has proposed regulation of the density of development and the protective measures needed for different conditions. The implementation section of this report (not a part of the Initial Safety Element) examines these standards and suggests possible modifications. These will be useful, in combination with good land use planning.

Fire protection facilities and staff are judged generally adequate and at a level which is feasible for this large, sparsely populated county. Mendocino's districts are well organized at the present time. As development continues and conditions change, consolidations will be advisable from time to time. This will allow pooling of resources and hiring of a more professional staff. In some urbanizing counties such as Santa Cruz there are old volunteer districts whose boundaries are no longer practical for present development patterns. Holding on to the old districts has been a matter of local pride and identity rather than efficiency. This should not be allowed to happen in Mendocino County; regular studies should be conducted to examine fire fighting resources and needs and consolidations should be effected when conditions warrant.

The Emergency Plan

Mendocino County needs to undertake the preparation of a practical and comprehensive Emergency Plan devoted especially to the possible kinds of natural emergencies which could occur in various sections of the County. This is one of the most important recommendations of the Safety Element.

The State Office of Emergency Services* indicates that the State emphasis and approach to disaster preparedness has been up-dated since the original Administrative Document for Mendocino County was completed in 1971. The State office now emphasizes natural hazards and local contingency planning versus the war emphasis in the original document. Local contingency planning is getting underway at the State level and Mendocino County will be required to do local contingency planning along with other jurisdictions in the State.

Information as to existing and potential hazards contained in the Seismic Safety and Safety Elements indicate that it is essential for the County to prepare such plans. The planning concept advocated by the State office is "mutual aid at the lowest level" with plans to send in assistance from outside agencies only if needed. Each small community is encouraged to have its own plans and to develop the capability to make an effective initial response to an emergency and to handle it locally as far as possible. This concept is particularly appropriate for Mendocino County where it is quite possible that a disaster could cut off some communities and outside help might not be available for several days. Building up the local action capability therefore is stressed in the Safety Element.

The County is currently preparing Area Plans for all of its developing areas. Plans are included for Anderson Valley, Redwood Valley, Potter Valley, Laytonville, Fort Bragg/Mendocino and Round Valley, with other area plans to follow. Following adoption, these area plans need to be supplemented with individual Emergency Contingency Plans. Such Emergency Plans would strengthen individual preparedness through education and dissemination of information and set up schemes for group action in appropriate sections of the County. Mutual assistance and coming to the aid of neighbors, a tradition in most rural areas, can be used to good advantage in disaster or relief in the County's more isolated valleys and hamlets.

* Information from Eric Orm of the Sacramento Office.

MENDOCINO COUNTY Safety Element

EMERGENCY FACILITIES



0 5
MILES

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NOVEMBER 1974

□ hospitals

1. MENDOCINO COAST
2. FRANK R. HOWARD MEMORIAL
3. HILLSIDE COMMUNITY
4. MENDOCINO COMMUNITY
5. UKIAH GENERAL

○ clinics

1. ROUND VALLEY
2. COASTAL HEALTH SERVICE
3. MENDOCINO COUNTY INDIAN HEALTH PROJECT

○ high schools

1. LEGGETT
2. LAYTONVILLE
3. FORT BRAGG NORTH COAST
4. WILLETS UNION
5. MENDOCINO
6. UKIAH UNION
7. ANDERSON VALLEY
8. POINT ARENA

○ county health department

1. BRANCH OFFICE
2. MESSAGE CENTER
3. MAIN OFFICE
4. MESSAGE CENTER

△ fairgrounds

1. UKIAH
2. BOONVILLE

— major roads

On the County-wide level, leadership and assistance from the Supervisors is needed to set up effective local programs and form emergency units based on the needed new Emergency Plan. Help will be needed to obtain and station emergency equipment in appropriate locations in the County. Personnel training will be required. Until the new Plan is prepared the best means of implementing Readiness Condition Four as described in the current Emergency Plan needs to be determined if implementation has not yet begun. Education and dissemination of information should be emphasized. Emergency facilities in addition to those shown on the Emergency Center Map may need to be set up and all centers must be organized and equipped to handle potential emergencies.

IMPLEMENTATION

This will require General Plan revisions and modernizing of the zoning ordinance in conformance with the Plan. Other implementation measures are also required. However, many new programs and regulations will take additional professional time and study by the residents and officials of the County. Some such measures are listed here for discussion and future consideration.

FIRE SAFE REGULATIONS FOR LAND DIVISIONS IN WILD AREAS

The Forest Service has presented the standards for density of development to the Board of Supervisors for consideration. These are based on present legislation and are below modern planning standards. Soil instability and earthquake hazard in this County suggest that these should be upgraded.

The Forest Service standards are:

Building density governed by slope:

Not more than six (6) lots per gross acre on level ground to a maximum of 5 percent slope

Not more than four (4) lots per gross acre on slopes of 6 to 15 percent

Not more than two (2) lots per gross acre on slopes of 16 to 30 percent

Not more than one (1) lot for each gross acre on slopes exceeding 30 percent

For rural areas which are slated for development the consultants would suggest the following modification:

0 to 5 percent slope - 3.3 dwelling per gross acre (equivalent to 10,000 square foot lots)

6 to 15 percent slope - 2 dwelling units per gross acre

16 to 30 percent slope - 1 dwelling unit per gross acre

Over 30 percent slope - Either 1 dwelling unit per 5-10 acres or even better, cluster development at low aggregate density on flat or relatively gentle slope areas with surrounding steep slopes left as common open space. Density of development would depend on conditions at any one site but would generally be low density overall.

The recommendations on access are generally satisfactory and necessary. This need not apply to short cul-de-sacs (less than 600-800 feet in length) or farm roads.

Every subdivision or parcel division shall have not less than two different ingress/egress routes.

No dead-end roads shall be allowed unless emergency access service roads tie two or more dead-end roads together. These service roads should not have less than 16' road width with 24' right of way easements.

The recommendations continue with provisions for water supply for 3 classes of development.

Water Supply

Water supply standards for emergency firefighting purposes are divided into three classes based on density.

Class I shall be a single family dwelling lot density of from 2 to 6 per acre on any one acre within the Land Division---community centers, schools, commercial areas, condominiums, apartments, multi-story structures, etc.

Class I requirements and definitions:

Hydrant Spacing: Fire hydrant spacing will be a minimum of 660' except in "D" below where the minimum will be 330'.

Hydrants: Fire hydrants must be able to meet the flow requirements but in no case should the fire hydrant be less than a standard wharf valve with single 2 1/2" NST outlet on a 4" riser for "A" and "B" below; a double 2 1/2" NST outlet hydrant on a 6" riser for "C" below; and a double 2 1/2" NST outlet and single steamer connection hydrant on a 6" riser for "D" below.

Distribution System: The distribution system should be designed to meet the flow requirements and should incorporate a grid or loop layout to insure maximum flow efficiency.

Water Pressure: Minimum residual water pressure will be 20 psi above that necessary to meet the requirements of normal domestic use.

Flow Requirement:

- A. 1 to 20 Class I lots. Minimum flow will be 250 gallons per minute above normal domestic use with two* hydrants in the system open. The system must be capable of maintaining the minimum flow for a period of two hours. The minimum emergency firefighting reserve should be not less than 30,000 gallons.
- B. 21 to 140 Class I lots. Minimum flow will be 500 gallons per minute above normal domestic use with two* hydrants in the system open. The system must be capable of maintaining the minimum flow for a period of two hours. The minimum emergency firefighting reserve should be not less than 60,000 gallons.
- C. Over 141 Class I lots. Minimum flow will be 750 gallons per minute above normal domestic use with two hydrants* in the system open. The system must be capable of maintaining the minimum flow for a period of two hours. The minimum emergency firefighting reserve should be not less than 90,000 gallons.
- D. Community center, school, and commercial areas (shopping centers, etc.) within any subdivision will require a minimum flow of 1,000 gallon per minute above normal domestic use with two* hydrants in the system open. The system must be capable of maintaining the minimum flow for a period of two hours. The minimum emergency firefighting reserve should be not less than 240,000 gallons.

* One 2 1/2" outlet per hydrant open to full flow.

Class II shall be a density of one single family dwelling lot from 1 to 5 acre parcels.

Class II requirements and definitions:

Hydrant Spacing: Fire hydrant spacing will be a minimum of 660'.

Hydrants: Fire hydrants must be able to meet the flow requirements but in no case should the hydrant be less than a standard wharf valve with a single 2 1/2" NST outlet on a 4" riser.

Distribution System: The distribution system should be designed to meet the flow requirement and should incorporate a grid or loop layout to insure maximum flow efficiency.

Flow Requirement: Minimum flow will be 250 gallons per minute above normal domestic use with two hydrants in the system open. The system must be capable of maintaining the minimum flow for a period of two hours. The minimum emergency firefighting reserve should be not less than 30,000 gallons.

Water Pressure: Minimum residual water pressure will be 20 psi.

Normal Domestic Use: In systems wherein domestic supply and emergency firefighting supply are integrated, normal domestic use is established as 350 gallons per single family dwelling per day.

or, In lieu of a public water system, each single family dwelling constructed on a Class II lot shall have an emergency firefighting reserve of at least 3,000 gallons. This reserve may be part of the private domestic system but must not be connected directly to or be dependent on a pressure system. The reserve may be in the form of a

storage tank, cistern, reservoir, or swimming pool, etc.. It must be readily accessible to mobile fire apparatus for direct draft or by gravity flow system with a 1 1/2" feeder line terminating in a 1 1/2" NST gated outlet.

or, As an additional alternate, the subdivider shall indicate on the tentative map locations of developed water storage facilities that will adequately serve the subdivision as approved by the responsible fire agency.

Class III are over 5 acre parcels with a density of one family dwelling per parcel.

Class III water requirements for fire protection purposes will not normally be required, but may be recommended by the responsible fire agency depending on individual circumstances.

Fire Break, Fuel Break, Green belts

A fire break is an area cleared of all flammable vegetation.

A fuel break is an area partially cleared with single species of shrubs and trees treated in such a manner as not to allow a continuous line of flammable fuel.

A green belt is defined as vegetative modification such as planting of fire-resistant species in lieu of native cover; lawn areas, and community use areas such as parks, playgrounds and golf courses.

All subdivisions located within fire hazardous areas shall contain an exterior boundary fuel break of not less than 30' in width.

Wild, natural, or nature areas within a subdivision shall have fuel break application for a minimum of 75' around the exterior boundary.

Large subdivisions of high density (more than four lots per acre) shall be divided so that every group of 40 or less lots must be divided from an adjacent group by some form of green belt with a minimum width of 75'.

All fire breaks, fuel breaks, and green belts shall be recorded easements and be provided with access for fire equipment.

ADDITIONAL FLOOD DAMAGE STUDIES AND IMPLEMENTATION MEASURES

The Framework Study recommends protection of agricultural land from once-in-ten-year floods and protection of urban areas from the once-in-100-year floods. This is a general recommendation which applies to the entire state. However, local conditions may make a greater or less degree of protection reasonable and desirable, either County-wide or in specific areas. This must be determined. The first step is detailed flood plain mapping and study of existing land uses. After study, the feasible and desirable degree of protection in relation to existing and proposed land uses must be determined.

Structural improvements recommended by the Framework Study have been out-dated by the Wild Rivers Act as previously noted. However, some structural improvements may be necessary and ways must be found to make them feasible if this proves true. The recommendations of the Framework Study are given in the following pages for informational purposes only. The Eel River proposals are included as is the disputed Warm Springs Dam on the Russian River to point out the scale of control deemed necessary at the time the report was prepared. Other levels and types of protection may be considered more desirable today. The complexities of the problem make it clear that comprehensive studies are vital to arriving at the best solutions. The County should take

all advantage possible of the HUD program of assistance for Flood Plain Management. This is described in the Background and Research section of this report.

Proposed new flood plain legislation for the County does not include retroactive provisions which would require removal of structures or uses which do not conform to the zoning in mapped flood plain areas and which could endanger life. This has been done in other parts of the State as cited in the Framework Study. It may be advisable, after complete studies have been made in Mendocino County, to add such provisions in areas where protection is economically or physically infeasible.

To implement the new state law concerning inundation areas below existing or proposed dams, the County may need to adopt policies and legislation requiring studies and setting up procedures to be followed in seeking approval for new projects.

GEOLOGIC AND SEISMIC INFORMATION BASE

There is very little that Mendocino County can do on its own in the way of basic research into the nature and forces of earthquakes or geology in the County. It should however press for continued studies by State agencies and by the Corps of Engineers. Expert consulting may be needed as well. Most importantly, it should be prepared to take full advantage of new information as it becomes available. The County should have technical advice available as needed. A consulting geologist seems the best short-range answer but in the future, a full time geologist on the staff may be needed.

RECOMMENDED FLOOD CONTROL MEASURES
COMPREHENSIVE FRAMEWORK STUDY, JUNE, 1971
WATER RESOURCES COUNCIL

(included for information only • not a part of the Initial Safety Element)

| Study Area/ time frame in which needed | Reservoir | Stream | Flood Control Capacity (ac.-ft.) | Drainage Area (sq. miles) |
|----------------------------------------------|-----------------------------|---------------------------|-------------------------------------------|---------------------------------|
| <u>Eel River Stream Group</u> | | | | |
| 1966-1980 | Detention Structure | Salmon Creek | 4,000 | 12 |
| 1981-2000 | Dos Rios ¹ | Middle Fork Eel | 600,000 | 745 |
| | English Ridge | Eel River | 140,000 | 488 |
| 2001-2020 | Yellow Jacket | Eel River | 700,000 | 960 |
| | Detention Structures (4) | (Various) | <u>37,000</u> | 135 |
| | | Total | 2,997,000 | |
| <u>Russian River Basin</u> | | | | |
| 1966-1980 | Warm Springs ² | Dry Creek | 130,000 | 130 |
| | Knights Valley | Franz & Maacama Creeks | 20,000 | 59 |
| | Detention Structures (2) | (Various) | 5,000 | 29 |
| 1981-2000 | Little Sulphur | Little Sulphur Creek | 36,000 | 32 |
| | Redwood Valley | Russian River | 13,000 | 14 |
| | Mark West | Mark West Creek | 26,000 | 34 |
| | Mill Creek | Mill Creek | 16,000 | 17 |
| | Detention Structures (5) | (Various) | 3,000 | 35 |
| 2001-2020 | Robinson Creek | Robinson Creek | 19,000 | 23 |
| | McDowell Creek | McDowell Creek | 17,000 | 23 |
| | Feliz Creek | Feliz Creek | 28,000 | 39 |

¹ Rejected in referendum and no longer an active proposal.

² Completed and funded for construction as of FY 1970 but still in controversy.

RESEARCH REPORT THE EFFECT OF ON THE

Information for reference is given in the following table.

| Year | Month | Day | Time | Location | Subject | Remarks |
|------|-------|-----|-------|----------|-------------|-----------------------|
| 1950 | Jan | 1 | 10:00 | Room 101 | Mathematics | First lesson |
| 1950 | Jan | 2 | 10:00 | Room 101 | Mathematics | Second lesson |
| 1950 | Jan | 3 | 10:00 | Room 101 | Mathematics | Third lesson |
| 1950 | Jan | 4 | 10:00 | Room 101 | Mathematics | Fourth lesson |
| 1950 | Jan | 5 | 10:00 | Room 101 | Mathematics | Fifth lesson |
| 1950 | Jan | 6 | 10:00 | Room 101 | Mathematics | Sixth lesson |
| 1950 | Jan | 7 | 10:00 | Room 101 | Mathematics | Seventh lesson |
| 1950 | Jan | 8 | 10:00 | Room 101 | Mathematics | Eighth lesson |
| 1950 | Jan | 9 | 10:00 | Room 101 | Mathematics | Ninth lesson |
| 1950 | Jan | 10 | 10:00 | Room 101 | Mathematics | Tenth lesson |
| 1950 | Jan | 11 | 10:00 | Room 101 | Mathematics | Eleventh lesson |
| 1950 | Jan | 12 | 10:00 | Room 101 | Mathematics | Twelfth lesson |
| 1950 | Jan | 13 | 10:00 | Room 101 | Mathematics | Thirteenth lesson |
| 1950 | Jan | 14 | 10:00 | Room 101 | Mathematics | Fourteenth lesson |
| 1950 | Jan | 15 | 10:00 | Room 101 | Mathematics | Fifteenth lesson |
| 1950 | Jan | 16 | 10:00 | Room 101 | Mathematics | Sixteenth lesson |
| 1950 | Jan | 17 | 10:00 | Room 101 | Mathematics | Seventeenth lesson |
| 1950 | Jan | 18 | 10:00 | Room 101 | Mathematics | Eighteenth lesson |
| 1950 | Jan | 19 | 10:00 | Room 101 | Mathematics | Nineteenth lesson |
| 1950 | Jan | 20 | 10:00 | Room 101 | Mathematics | Twentieth lesson |
| 1950 | Jan | 21 | 10:00 | Room 101 | Mathematics | Twenty-first lesson |
| 1950 | Jan | 22 | 10:00 | Room 101 | Mathematics | Twenty-second lesson |
| 1950 | Jan | 23 | 10:00 | Room 101 | Mathematics | Twenty-third lesson |
| 1950 | Jan | 24 | 10:00 | Room 101 | Mathematics | Twenty-fourth lesson |
| 1950 | Jan | 25 | 10:00 | Room 101 | Mathematics | Twenty-fifth lesson |
| 1950 | Jan | 26 | 10:00 | Room 101 | Mathematics | Twenty-sixth lesson |
| 1950 | Jan | 27 | 10:00 | Room 101 | Mathematics | Twenty-seventh lesson |
| 1950 | Jan | 28 | 10:00 | Room 101 | Mathematics | Twenty-eighth lesson |
| 1950 | Jan | 29 | 10:00 | Room 101 | Mathematics | Twenty-ninth lesson |
| 1950 | Jan | 30 | 10:00 | Room 101 | Mathematics | Thirtieth lesson |

1. Data on the effectiveness of the program is given in the following table.

2. Data on the effectiveness of the program is given in the following table.

| Study Area/ time frame in which needed | Levee (bank miles) | Channel (miles) |
|----------------------------------------------|-----------------------|--------------------|
|----------------------------------------------|-----------------------|--------------------|

North Coastal Stream Group¹

| | | |
|-----------|---|---|
| 2001-2020 | 6 | 6 |
|-----------|---|---|

Russian River Basin

| | | |
|-----------|---|----|
| 1966-1980 | 0 | 80 |
|-----------|---|----|

| | | |
|-----------|---|---|
| 1981-2000 | 0 | 3 |
|-----------|---|---|

| | | |
|-----------|---|----|
| 2001-2020 | 0 | 16 |
|-----------|---|----|

¹ Included in the above tabulation is the Eel River Delta Project which is in advance engineering and design stage.



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